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American Management Association

Cooperation With Engineering Colleges

By the Committee on
RELATIONS WITH ENGINEERING COLLEGES

Chairman

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NATIONAL PERSONNEL ASSOCIATION

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COMMITTEE ON RELATIONS WITH ENGINEERING
COLLEGES

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bring their copies of reports with them. No copies will be avail-
able for free distribution at the convention.*

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Cooperation with Engineering Colleges

I. INTRODUCTION

The Committee on Technical Training presented extensive reports to the National Association of Corporation Training in 1918, 1919 and 1921. These reports reviewed the possible ways and means of cooperation between corporations and engineering colleges to promote a better understanding of each other's problems, to supply the proper industrial background to college training and to facilitate the employment of graduates. The confusion in the colleges and the interruptions of their regular programs caused by the unrelated recruiting activities of the corporations were clearly brought out. Valuable suggestions were offered looking toward improvement through the Association as the correlating agency of the corporations. While no continuing activities were set up the surveys were of definite value in clarifying the situation and paving the way for more effective cooperation.

The present committee has construed its principal function as the building up of a working relationship between the Association and the engineering colleges. It is believed that this relationship should rest on a solid foundation of mutual service and that it should supplement but not duplicate other cooperative efforts. The approach to this basis of mutual service involves four lines of inquiry:

1. The respects in which member companies are concerned with engineering education.
2. The activities of other agencies already active in this field.
3. The forms of assistance for which the engineering colleges may appropriately look to this Association.
4. The services which the Association can render its member companies which it would be impracticable or costly for them to obtain individually.

II. SCOPE OF RELATIONS WITH ENGINEERING COLLEGES

The Concern of Member Companies in Engineering Education

The member companies are interested in engineering colleges as :

- Sources of trained personnel
- Agencies of research and expert consultation
- Agencies of publicity
- Molders of public opinion.

Member companies employ engineering graduates in large numbers. They are concerned with the adequacy of the supply of graduates to meet the industrial demand, with the type of men whom the engineering colleges attract, with the appropriations and the thoroughness of their training, with suitable terms of employment, with college records and other aids to the selection of graduates, with the kind and amount of information available to students concerning various fields of service, and with the agencies in the colleges for vocational counsel and placement.

Member companies frequently encounter research problems which can best be handled in the finely equipped laboratories of the colleges. To advantage they can frequently engage engineering teachers as consulting experts. These occasions are most apt to arise in connection with problems of greater theoretical difficulty or scientific refinement than the regular facilities of the Company provide for. A number of institutions have definitely organized bureaus for such services and are prepared to execute definite contracts.

Engineering colleges are important agencies of publicity and molders of opinion. Member companies are concerned that their distinctive fields of activity shall be fairly and adequately presented in the courses of instruction, in the discussions of student societies, in the student publications and in the informal, but often influential, comments of the instructors.

As engineers constitute an increasingly influential group in modern industry and government, all member companies are concerned that the schools shall ground them in sound principles and equip them with sound methods in their relations to social and economic questions. There is a need that engineers shall attack these questions with the same unprejudiced fact-finding, analytical methods as they have used with such marked success on material problems. As a balance to these dispassionate, scientific methods there is an equal

need among engineers for sympathetic insight into human motives and aspirations and an understanding of the principles which underlie governmental, business and industrial organization.

It is scarcely necessary to emphasize the fundamental importance of this group of interests, nor to urge the propriety of this Association having an active part in shaping the progress of engineering education.

Other Agencies Active in Shaping Engineering Education

An active interest in engineering education is being taken by twenty or more organizations of national scope. These fall naturally into five groups, viz., (1), professional societies of engineers, such as the American Society of Civil Engineers, the American Institute of Electrical Engineers and the like; (2), associations of industries, ranging from the widely inclusive National Industrial Conference Board to the grouping of specific industries, such as the American Electric Railway Association; (3), the distinctly educational societies, notably the Society for the Promotion of Engineering Education, whose membership consists largely of engineering teachers; (4), the endowed foundations, such as the Carnegie Foundation and General Education Board; and (5), government agencies.

The professional engineering societies have committees on education and maintain student branches at the engineering colleges. They encourage research in educational institutions, publish and discuss papers on the advances in professional practice, voice the aims and ideals of the engineering professions and seek to guide the evolution of the courses of study and methods of teaching in keeping with these ideals and aims. Next to the schools, they are the most important educational agencies in the engineering field.

The associations of particular industries are quite active along publicity lines, seeking to create a favorable attitude toward such industries and to induce graduates to enter their employ. The National Industrial Conference Board has set up a Joint Conference Committee on Engineering Education with a like committee from the Society for the Promotion of Engineering Education. The scope of this joint committee's activities is well expressed by the following quotations from an official statement published by the Conference Board:

"It was emphasized as a primary consideration that American industry's efficient development and contribution to the national welfare

is closely bound up with the character and efficiency of the professional engineers educated in the various engineering schools, and required in industry as technical experts and inventors, as managers and executives of industrial enterprises. Equally important is the development of competent men as instructors in the engineering schools.

"For these reasons, and also because engineering schools are, after all, a part of the industrial system, and must therefore function efficiently if the system as a whole is to be efficient, it was agreed that there must be a close and cooperative relationship between engineering schools and American industry in its various branches; and adequate methods must be developed under which each will help the other in the common cause of adequately training professional engineers.

"The Committee is not concerned with details of college curricula, but with the broader aspects of the problem, such as the best way of fitting the graduate of the engineering schools into industry; whether and how best to give the student industrial training coincident with his academic studies; an adequate supply of high-grade instructors and a better understanding of their responsibilities by both industry and the engineering schools."

The Society for the Promotion of Engineering Education has further created from its own membership a Board of Investigation and Coordination whose objects are stated to be:

"1. To ascertain the facts in engineering education, such as concerns (a) teachers, their origin, training, experience and effectiveness; (b) teaching facilities; (c) curriculums; (d) students and graduates, their origin, training, experience and effectiveness.

2. To ascertain present and future requirements in the fields served by engineer graduates.

3. To present the facts and requirements for their bearing on the training of the engineer to the end that he may (a) develop himself and his profession; (b) realize and fulfill his obligation to society.

4. To maintain close contact with engineering schools enabling them to participate in the investigations; and reporting to them from time to time; to the end that the developments may be continuous from the initial contact between the colleges and the agencies of the Board.

5. To secure the necessary funds for these purposes."

It is proposed to place a salaried director, with adequate staff, at the head of this Board and to create a Board of Counsellors representing the several industrial fields to which engineering education is related.

The endowed foundations are chiefly concerned with the financial support of higher education and with broad investigations of educational practice.

The United States Bureau of Education has given active attention to promoting closer relations between education in business and in engineering. Two largely attended public conferences have been held on this subject, and substantial progress has been made in the direction of greater emphasis of business principles and practice in engineering schools.

Assistance Which This Association May Give the Engineering Colleges

The engineering colleges have a strong claim on the assistance of the industries in return for services rendered. The schools have made inestimable contributions to scientific knowledge from which the industries have profited without cost. Education has increased earning power and so has made possible the markets on which many industries depend for existence. The colleges have expended on each engineering graduate from \$800 to \$2000 above all fees received. The industries profit by this training and would be compelled to provide costly substitutes for it if it were not available. The ways and means by which this assistance may be given by the industries are indicated in the following outline:

Forms of Assistance to Engineering Colleges from Corporations

a. Financial Assistance.

1. Contributions to funds for plant and equipment.
2. Contributions to general endowments.
3. Contributions to funds for current expense.
4. Endowment of chairs and lectureships.
5. Endowment for research.
6. Specific grants for research.
7. Establishment of scholarships.
8. Employment of teachers for expert services by financial arrangement with the college.
9. Use of influence in campaigns for endowment or increased public support.

b. Material Assistance.

1. Donations of equipment for plant and laboratories.
2. Special discounts on equipment and supplies.
3. Loans of equipment.

c. Teaching and Administrative Service.

1. Loan of industrial experts for teaching services.

2. Services of lecturers for special courses.
 3. Services of executives on boards of trustees, on visiting committees, in conference on administrative problems, in financial campaigns and in appeals for increased public support.
- d. *Subject Matter and Other Aids to Instruction.*
1. Supply of engineering circulars, data sheets, problems and drawings.
 2. Supply of special engineering information on request.
 3. Supply of educational material prepared for Company use.
 4. Supply of Company magazines, when of serious interest.
 5. Supply of reprints of publications of employees.
 6. Broad-gauge publication policy on books and papers.
- e. *Supplying Industrial Background and Experience.*
1. Intelligently organized inspection trips.
 2. Employment of students on cooperative part-time plan.
 3. Employment of students in vacations at educationally valuable work.
 4. Employment of teachers in vacations, during periods of leave and on special problems.
- f. *Contributions to Morale.*
1. Emphasis on permanent vs. transient values in college life, in advertising, interviews, talks to students and material supplied to student publications.
 2. Reports to colleges on achievements of their graduates.
 3. Courtesies to teachers which encourage them in the sense of the value of their work.
- g. *Publicity of Educational Value.*
1. Stimulating and constructive advertising in college papers.
 2. Lectures, personally delivered or supplied in manuscript form with illustrative material.
 3. Loans of films, slides, photographs and exhibits.
- h. *Contributions to Vocational Guidance of Students.*
1. Through carefully prepared vocational literature on various phases of industry and commerce.
 2. Through opportunities extended to deans, appointment secretaries and teachers to study workings of corporations in detail and on the ground.

3. Through addresses to student groups.
 4. Through constructive handling of employment interviews.
 5. Through surveys of the annual requirements for graduates in representative industries.
- i. Contributions to Educational Research.*
1. Publication of job analyses giving the technical content of work done by engineering graduates.
 2. Publication of results obtained by corporations with psychological tests, rating scales, aptitude tests and the like.
 3. Publication of data bearing on the degree and type of success attained by young engineers as related to their scholastic records and their non-scholastic activities as college students.

The above outline does not exhaust the possibilities of cooperation. Instances of actual cooperation between industries and colleges could be cited under practically every item. Many of the activities listed are of such a nature that they can best be undertaken on the initiative of individual corporations, the Association lending its active encouragement and in some cases, performing a clearing-house service. Items in the general groups I to VII inclusive appear to be of this general character. The groups VIII and IX are particularly appropriate for joint initiative through this Association.

Appropriate Fields of Service to Member Companies

The services which this Association can render its member companies in their relations with engineering colleges appear to be of two general types:

- Clearing house on matters of information.
- Agency of investigation and promotion.

Clearing house services may include such matters as information to member companies on the numbers of graduates available for employment, classified by colleges, courses of study, and preferences as to type of employment; information on appropriate starting rates and other terms of employment for graduates; information on the extent of recruiting activities planned by member companies; information on the practices of member companies relative to gifts, loan and sale of equipment and supplies at discount prices; address lists of deans, professors and appointment secretaries to facilitate sending out bulletins and other information; names of teachers or institutions particularly well equipped to handle special

problems; names of engineering teachers available for summer employment; and the methods of handling employment matters at particular institutions.

Clearing house services to the college may properly include supplying information on the probable numbers of recruits to be sought by member companies, on opportunities for the vacation employment of teachers and undergraduates and on sources from which speakers, exhibits, films, slides and technical information may be obtained among member companies.

In its function as an agency of investigation and promotion the Association may serve the member companies by studying the methods of vocational counsel and placement employed by the colleges and formulation suggestions for the strengthening of this work; by collecting, editing and disseminating sound and unprejudiced information on the vocational opportunities for engineering graduates in the several industries and commercial groups making up its membership; by giving circulation among the colleges to valuable data and results appearing in its publications; and by serving as an official agency of cooperation for the personnel interests of the country with other agencies active in shaping engineering education.

III. RECOMMENDATIONS

The following recommendations are offered as to a working program for the coming year:

1. That the Association should recognize the priority of interest of the national engineering societies and the Society for the Promotion of Engineering Education in shaping courses of study and methods of teaching on the technical side, but that the Association should seek to cooperate actively with these bodies to the end that the human relations of industry and the principles of commercial and industrial organization may be given due recognition in engineering education.

2. That the Association should offer its active cooperation to the National Industrial Conference Board and the Society for the Promotion of Engineering Education in their joint investigation of the extent and nature of the industrial demand for trained engineers.

3. That the Association should make an investigation of the methods of vocational counsel and placement of graduates em-

ployed in the engineering colleges and formulate recommendations for the strengthening of this work.

4. That the Association should make an annual survey of the requirements of the member companies for engineering graduates, both as to number and type, for the information of the companies and the colleges, and that this survey be closely coordinated with similar inquiries made through the National Industrial Board.

5. That the Association should make an annual survey of the supply of graduates at the several engineering schools, and if practicable, of their preferences as to type of employment, for the information of member companies.

6. That the Association should make an annual survey of the opportunities for vacation employment open to engineering students and instructors in member companies, for the information of the colleges.

7. That the Association should undertake to render clearing house services to member companies and engineering colleges as outlined under Section II above.

8. That the Association should begin the preparation of a series of bulletins for circulation among college officers and students in which the nature, organization, fundamental technology and business outlook of the principal fields of industrial and commercial activity are set forth from the viewpoint of the vocational guidance of engineering students.

9. That the Association encourage the preparation of articles on the distinctive features of various industries which should be considered in judging opportunities for employment after graduation and arrange for their appearance in student publications.

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